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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Applicati n

Inventors: Frederick T. Brady et al.

Serial No.: 09/590805

Filing Date: 6/9/2000

Art Unit: 2813

Examiner: Thompson, Craig

Docket No.: 280-003US

Title: Increasing The Susceptibility Of An Integrated Circuit To Ionizing Radiation

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I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on 28 February 2003.

Name of person signing this certificate: Lawrence R. Gabuzda

Signature

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

APPELLANT'S BRIEF IN REPLY TO THE EXAMINER'S ANSWER UNDER 37 CFR §1.193

The Claims DO NOT Stand
Or Fall Together

In Section 7 of its Brief, the appellant asserted that claims 1-7 and 22-25 on appeal do not stand or fall together. The appellant identified six claim groupings for review by the Board.

In his Answer, the Examiner states that the claims do not stand or fall together because "appellant does not argue and explain the separate patentability of each and every claim." (Answer at paragraph (7).) Appellant disagrees.

In Section 8 of its brief, appellant demonstrates the patentability of each of the claims in each of the claim groupings for each of the issues under review (*see* discussion, under Section 8, of Issues 6(b) through 6(e)). The reasons why the claims are *separately* patentable is implicit in the appellant's arguments.

Consider, for example, appellant's treatment of Issue 6(b). Appellant argues for the patentability of group 1 claims (*i.e.*, claims 1 and 2), noting that the prior art does not disclose or suggest the claimed limitation of two devices having different radiation susceptibility (*i.e.*, two different types of transistors, *etc.*) that are electrically connected to one another.

Appellant then argues for the patentability of group 3 claims (*i.e.*, claims 4 and 5), noting that the prior art does not disclose or suggest an integrated circuit having "a microprocessor that comprises a control sequencer coupled to an arithmetic logic unit" (claim 4) nor an integrated circuit having an "arrangement of memory cells operatively connected to an address decoder" claim 5. Appellant asserted that "claims 4 and 5 are allowable over Kalnitsky and the APA *on this basis*." (Emphasis added.) Arguments are presented for each of the other claim groupings.

Appellant does not merely (1) demonstrate the patentability of the independent claims, (2) assert that the dependent claims are allowable based on that dependency, and then simply (3) point to the difference in claim limitations to support the separate claim groupings. Rather, appellant shows why *each* of six claims groupings are patentable over the prior art.

In an attempt to bolster his position, the Examiner asserts that the cited art "teach all the limitations of the claims" and that "[n]one of the dependent claims introduce

limitations which are not taught" by the prior art." The appellant disagrees of course ... that's what this appeal is about. But this has no bearing on whether applicant has made certain arguments. That is to say, it's one thing to disagree about the prior art, it's quite another to say that the applicant hasn't made any arguments because the arguments are incorrect – which is essentially what the Examiner argues here!

The Claims on Appeal
Are Allowable over the
Art of Record

The Examiner maintains his position that claims 1-7 and 22-25 are obvious over Kalnitsky or Murdock et al. in view of AAPA. Appellant's position is clearly stated in its Brief and will not be re-argued here. Suffice it to say that appellant disagrees with all of the Examiner's conclusions as to the obviousness of the claims.

In section 11 of his Answer, the Examiner responds to some of appellant's arguments. Some of those responses are addressed below.

(a) Electrical Isolation

In its Brief, appellant argued that in Kalnitsky's invention, the dose-hard transistors and standard transistors are electrically isolated from one another so that performance differences can be evaluated (*i.e.*, via a sensor). The Examiner asserts that Kalnitsky teaches a biasing circuit, which is composed of two devices. So, according to the Examiner, the two devices (transistors) must be electrically connected.

Kalnitsky discloses that:

> a "self-adapting" circuit could be used to compensate for the loss of performance due to the ionizing radiation. For example, a substrate biasing circuit composed of two types of transistors could be used to sense the different degradation characteristics of the transistors and a differential signal could then be used to adjust for the radiation-induced loss of performance. (Col. 3, lines 40-48.)

Appellant's point is that in claim 1 under appeal, a *hot* lead of two devices (*i.e.*, two transistors having a different susceptibility to ionizing radiation) are connected to one another. Language to the same effect is recited in claim 22: a *hot* lead of a utile device (radiation-hard transistor) is connected to a hot lead of a safeguard device (radiation-soft transistor). In this context, the hot lead is "lead 1" since claims 1 and 22 recite that the third lead of each device is connected to ground. This connection is

required so that when the "softer" transistor malfunctions (conducts), the "harder" transistor and whatever other circuitry it is connected to goes with it. That's a key aspect of applicant's invention.

On the other hand, in Kalnitsky, the hot lead of a radiation-hard transistor and the hot lead of a radiation-soft transistor cannot be connected to one another. If they were connected, then the sensor could not sense any difference between the two types of transistors. Note Kalnitsky's language concerning "a differential signal." Essentially, Kalnitsky is disclosing attaching the two different transistors to a differential amplifier. Clearly, two transistors that are connected to a differential amplifier are not electrically connected to one another.

(b) Soft Diodes

The Examiner argues that the terms "soft diode" and "hard diode" are well known in the art. According to the Examiner, "soft diodes have lower threshold voltage and are thus more susceptible to ionizing radiation. Hard diodes, on the other, have higher threshold voltage and are thus less susceptible to ionizing radiation." (Examiner's Answer at p. 7.)

As appellant has previously pointed out, this reasoning is faulty. It might be that a soft diode has a lower threshold voltage than a hard diode. But, even if this is true, this DOES NOT MEAN that a soft diode is more susceptible to ionizing radiation than a hard diode.

The Examiner's incorrect understanding of diodes and ionizing radiation appears to derive from the theory of the radiation susceptibility of transistors as described by the appellant (*see*, specification at p. 1, line 24 through p.3, line 29). The radiation susceptibility of transistors pertains to the presence of a real but parasitic transistor structure that results from artifacts in the manufacturing of an operating transistor. The operating transistor and parasitic transistor each have their own threshold voltage and are each affected differently by exposure to ionizing radiation.

Simply put, the term "soft" diode, as used in Murdoch et al., has nothing to do with a diode's response to ionizing radiation. Murdock et al. use this term to identify a diode that might "conduct at less than the operating voltage, V_o, of magnetoresistive sensor element 34." (Col. 10, lines 26-29.) But that says nothing whatsoever about the relative susceptibility to ionizing radiation of that "soft diode" as compared to the magnetoresistive sensor element.

(c) Defined terms

The Appellant argued that the Murdock et al. soft diodes are not a first "device," nor is the magnetoresistive sensor as second "device," as the term "device" is used by applicants. In particular, the term "device" is defined in the specification to mean "transistor and the surrounding materials that affect its operating parameters." (Spec at p. 7, lines 29+.) The Examiner cannot ignore applicants' definition.

The Examiner responded that the limitation of the device being a transistor is not recited in the rejected claims. And, according to the Examiner, "[a]lthough the claims are interpreted in light of the specification, limitations from the specification are not read into the claims." (Answer at p. 8.)

Appellant agrees with the Examiner that limitations from the specification are not to be read into the claims. But that is not what's happening.

During examination, the Examiner should give claim language its broadest reasonable interpretation. And when an applicant explicitly defines a term to mean something, the broadest reasonable interpretation is the definition that the applicant has provided and nothing more. In this case, the appellant defined the term "device" to mean "transistor...." That being the case, the Examiner cannot construe the term "device" to mean "diode" or any other electrical component other than a transistor.

During the course of preparing this Reply, appellant noticed that there are antecedent problems with claim 22. In particular, the claim recites a "safeguard device" and a "utile device," and then inadvertently refers to those devices as a "first device" and a "second device," respectively. For the purposes of Examination, the "first device" should be read as "safeguard device" and the "second device" should be read as "utile device." Appellant will correct the language of this claim, as appropriate, on disposition of this Appeal.

Respectfully,

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